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1 [APL and finite elements for solving convection-diffusion problems, with examples from gas bearing design](#)

F. Hendriks

December 1987 APL '88: Proceedings of the international conference on APL

Publisher: ACM

Full text available: pdf(871.25 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

The increasing popularity of finite element techniques to solve fluid flow problems has been due, in large part, to its geometric flexibility and adaptability. APL shares that property. Therefore, it is a natural companion to finite element modelling. ...

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2 [Particle-based fluid simulation for interactive applications](#)

Matthias Müller, David Charypar, Markus Gross

July 2003 SCA '03: Proceedings of the 2003 ACM SIGGRAPH/Eurographics symposium on Computer animation

Publisher: Eurographics Association

Full text available: pdf(2.21 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [cited by](#), [index terms](#)

Realistically animated fluids can add substantial realism to interactive applications such as virtual surgery simulators or computer games. In this paper we propose an interactive method based on Smoothed Particle Hydrodynamics (SPH) to simulate fluids ...

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3 [Transport and anisotropic diffusion in time-dependent flow visualization](#)

D. Bürkle, T. Preußner, M. Rumpf

October 2001 VIS '01: Proceedings of the conference on Visualization '01

Publisher: IEEE Computer Society

Full text available: pdf(5.85 MB) [Publisher Site](#) Additional Information: [full citation](#), [abstract](#), [references](#), [cited by](#), [index terms](#)

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The visualization of time-dependent flow is an important and challenging topic in scientific visualization. Its aim is to represent transport phenomena governed by time-dependent vector fields in an intuitively understandable way, using images and animations. ...

Keyw ords: flow visualization, multiscale image processing, nonlinear diffusion, transport diffusion, upwind method

4 [Block-iterative finite element computations for incompressible flow problems](#)



T. E. Tezduyar, R. Glowinski, J. Liou, T. Nguyen, S. Poole

June 1988 ICS '88: Proceedings of the 2nd international conference on Supercomputing

Publisher: ACM

Full text available: [pdf\(1.82 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

A block-iterative finite element procedure is presented for two-dimensional fluid dynamics computations on multiply-connected domains based on the vorticity - stream function formulation of the incompressible Navier-Stokes equations. The difficulty associated ...

5 [Solving systems of partial differential equations using object-oriented programming techniques with coupled heat and fluid flow as example](#)



Hans Petter Langtangen, Otto Munthe

March 2001 ACM Transactions on Mathematical Software (TOMS), Volume 27 Issue 1

Publisher: ACM

Full text available: [pdf\(1.01 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

This paper exploits object-oriented implementation techniques to facilitate the development computer codes for solving systems of coupled partial differential equations. We show how to build a simulator for equation systems by merging independent solvers ...

Keyw ords: C++ , coupled heat-fluid, diffpack, finite elements, non-Newtonian fluids, object-oriented programming, software development, systems of partial differential equations

6 [APL and finite elements for solving convection-diffusion problems, with examples from gas bearing design](#)



F. Hendriks

December 1987 ACM SIGAPL APL Quote Quad, Volume 18 Issue 2

Publisher: ACM


Full text available: [pdf\(871.25 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

The increasing popularity of finite element techniques to solve fluid flow problems has been due, in large part, to its geometric flexibility and adaptability. APL shares that property. Therefore, it is a natural companion to finite element modelling. ...

7 [Physically-based visual simulation on graphics hardware](#)

Mark J. Harris, Greg Coombe, Thorsten Scheuermann, Anselmo Lastra
September 2002 HWS '02: Proceedings of the ACM SIGGRAPH/EUROGRAPHICS
conference on Graphics hardware

Publisher: Eurographics Association

Full text available:  [pdf\(2.65 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [cited by](#), [index terms](#)

In this paper, we present a method for real-time visual simulation of diverse dynamic phenomena using programmable graphics hardware. The simulations we implement use an extension of cellular automata known as the coupled map lattice (CML). CML represents ...

Keywords: CML, coupled map lattice, graphics hardware, multipass rendering, reaction-diffusion, visual simulation


8 [Modeling the motion of a hot, turbulent gas](#)


Nick Foster, Dimitris Metaxas
August 1997 SIGGRAPH '97: Proceedings of the 24th annual conference on
Computer graphics and interactive techniques
Publisher: ACM Press/Addison-Wesley Publishing Co.

Full text available:  [pdf\(5.92 MB\)](#) Additional Information: [full citation](#), [references](#), [cited by](#)

Keywords: animation, convection, gas simulations, gaseous phenomena, physics-based modeling, smoke, steam, turbulent flow

9 [Animation and rendering of complex water surfaces](#)


 Douglas Enright, Stephen Marschner, Ronald Fedkiw
July 2002 SIGGRAPH '02: Proceedings of the 29th annual conference on
Computer graphics and interactive techniques
Publisher: ACM


Full text available:  [pdf\(2.75 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [cited by](#), [index terms](#)

We present a new method for the animation and rendering of *photo-realistic* water effects. Our method is designed to produce visually plausible three dimensional effects, for example the pouring of water into a glass (see figure 1) and the breaking ...

Keywords: computational fluid dynamics, implicit surfaces, natural phenomena, physically based animation, rendering, volume rendering

10 [Animation and rendering of complex water surfaces](#)

 Douglas Enright, Stephen Marschner, Ronald Fedkiw
July 2002 ACM Transactions on Graphics (TOG), Volume 21 Issue 3
Publisher: ACM

Full text available:  [pdf\(2.75 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [cited by](#), [index terms](#)

We present a new method for the animation and rendering of *photo-realistic* water effects. Our method is designed to produce visually plausible three

dimensional effects, for example the pouring of water into a glass (see figure 1) and the breaking ...


Keyw ords: computational fluid dynamics, implicit surfaces, natural phenomena, physically based animation, rendering, volume rendering

11 [Case study: visualization and analysis of high Rayleigh number --- 3D convection in the Earth's mantle](#)

Gordon Erlebacher, David A. Yuen, Fabien Dubuffet

October 2002 VIS '02: Proceedings of the conference on Visualization '02

Publisher: IEEE Computer Society

Full text available:  pdf(5.48 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Data sets from large-scale simulations (up to 501^3 grid points) of mantle convection are analyzed with volume rendering of the temperature field and a new critical point analysis of the velocity field. As the Rayleigh number Ra is increased ...

Keyw ords: critical points, feature extraction, mantle convection, plumes, unsteady flow, volume rendering


12 [Melting and flowing](#)



Mark Carlson, Peter J. Mucha, R. Brooks Van Horn, III, Greg Turk

July 2002 SCA '02: Proceedings of the 2002 ACM SIGGRAPH/Eurographics symposium on Computer animation

Publisher: ACM

Full text available:  pdf(4.77 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [cited by](#)

We present a fast and stable system for animating materials that melt, flow, and solidify. Examples of real-world materials that exhibit these phenomena include melting candles, lava flow, the hardening of cement, icicle formation, and limestone deposition. ...


Keyw ords: animation, computational fluid dynamics, melting, solidifying

13 [MCMR: a fluid view on time dependent volume data](#)

Wim de Leeuw, Robert van Liere

May 2003 VIS '03: Proceedings of the symposium on Data visualisation 2003

Publisher: Eurographics Association

Full text available:  pdf(2.22 MB) Additional Information: [full citation](#), [abstract](#), [index terms](#)

Mass Conservative Motion Reconstruction is a new method for estimating motion in time dependent volume data. A time dependent vector field representing the movement of the data is computed from a sequence of scalar volume data sets. The principle of ...

Keyw ords: conservation of mass, flow visualization, motion reconstruction, vector fields, volume visualization


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[BM3D: motion estimation in time dependent volume data](#)

Wim de Leeuw, Robert van Liere

October 2002 VIS '02: Proceedings of the conference on Visualization '02

Publisher: IEEE Computer Society

Full text available:  [pdf\(1.81 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

This paper describes BM3D: a method for the analysis of motion in time dependent volume data. From a sequence of volume data sets a sequence of vector data sets representing the movement of the data is computed. A block matching technique is used for ...

Keyw ords: biomedical imaging, feature tracking, vector fields, volume visualization

15 [Performance modeling and tuning of an unstructured mesh CFD application](#)

William D. Gropp, Dinesh K. Kaushik, David E. Keyes, Barry Smith

November 2000 Supercomputing '00: Proceedings of the 2000 ACM/IEEE conference on Supercomputing (CDROM)

Publisher: IEEE Computer Society

Full text available:  [pdf\(109.40 KB\)](#)  [Publisher Site](#) Additional Information: [full citation](#), [abstract](#), [references](#), [cited by](#), [index terms](#)


This paper describes performance tuning experiences with a three-dimensional unstructured grid Euler flow code from NASA, which we have reimplemented in the PETSc framework and ported to several large-scale machines, including the ASCI Red and Blue ...

16 [A multigrid solver for boundary value problems using programmable graphics hardware](#)

Nolan Goodnight, Cliff Woolley, Gregory Lewin, David Luebke, Greg Humphreys

July 2003 HWS '03: Proceedings of the ACM SIGGRAPH/EUROGRAPHICS conference on Graphics hardware

Publisher: Eurographics Association

Full text available:  [pdf\(2.80 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [cited by](#), [index terms](#)

We present a case study in the application of graphics hardware to general-purpose numeric computing. Specifically, we describe a system, built on programmable graphics hardware, able to solve a variety of partial differential equations with complex ...


17 [Designing software for one-dimensional partial differential equations](#)



N. L. Schryer

March 1990 ACM Transactions on Mathematical Software (TOMS), Volume 16 Issue 1

Publisher: ACM

Full text available:  [pdf\(871.03 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [cited by](#), [index terms](#), [review](#)

Users of software for solving partial differential equations are often surprised

by its inability to formulate their problems. Computer scientists speak of partial differential equations (PDEs) as canonical coupled systems, typically in divergence form. ...

18 [SPRINT2D: adaptive software for PDEs](#)



M. Berzins, R. Fairlie, S. V. Pennington, J. M. Ware, L. E. Scales

December 1998 ACM Transactions on Mathematical Software (TOMS).

Volume 24 Issue 4

Publisher: ACM

Full text available: [pdf\(207.17 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [cited by](#), [index terms](#)

SPRINT2D is a set of software tools for solving both steady an unsteady partial differential equations in two-space variables. The software consists of a set of coupled modules for mesh generation, spatial discretization, time integration, nonlinear ...

Keyw ords: adaptivity, error control, finite-volume methods

19 [FOAM: expanding the horizons of climate modeling](#)



Michael Tobis, Chad Schafer, Ian Foster, Robert Jacob, John Anderson

November 1997 Supercomputing '97: Proceedings of the 1997 ACM/IEEE conference on Supercomputing (CDROM)

Publisher: ACM

Full text available: [pdf\(119.71 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#)

We report here on a project that expands the applicability of dynamic climate modeling to very long time scales. The Fast Ocean_Atmosphere Model (FOAM) is a coupled ocean-atmosphere model that incorporates physics of interest in understanding decade ...

Keyw ords: climate, distributed memory, hydrology, massively parallel, message passing, meteorology, oceanography, scientific supercomputing

20 [Visualization of Steep Breaking Waves and Thin Spray Sheets Around a Ship](#)

Paul Adams, Douglas Dommermuth

October 2003 VIS '03: Proceedings of the 14th IEEE Visualization 2003 (VIS'03)





Publisher: IEEE Computer Society

Full text available: [pdf\(264.44 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#)

The simulation of breaking of waves, the formation of thin spray sheets, and the entrainment of air around the next generation of naval surface combatants is an ongoing 3-year Department of Defense (DoD) Challenge Project. The goal of this project is ...

Keyw ords: isosurfaces, marching cubes, multilevel parallelism

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